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| 10/810,907      | 03/26/2004  | Robert M. Keolian    | PST-11302/36        | 9429             |

25006 7590 11/02/2005

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| EXAMINER |
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AGUIRRECHEA, JAYDI A

|          |              |
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| ART UNIT | PAPER NUMBER |
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2834

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/810,907

Applicant(s)

KEOLIAN ET AL.

Examiner

Jaydi A. Aguirrechea

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) 25-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 19 and 40 is/are rejected.
- 7) ☒ Claim(s) 6-18 and 20-24 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/04</u> | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Claims 25-38 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Applicant timely traversed the restriction (election) requirement in the reply filed on 8/18/05.

The traversal is on the ground(s) that claims 39 and 40 should be examined along with claims 1-25. The Examiner agrees to examine claim 40. However, claim 39 requires a second volume of gas and a spring, which are not required for the invention of group 1, therefore claim 39 is still restricted and not examined.

### ***Specification***

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Claim Objections***

3. Claim 1 is objected to because of the following informalities: in line 11-12, "the resonating mass" lacks antecedent basis. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 1-5 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Blok (US 6314740) in view of Kolm et al. (US 4467236).

With regards to claims 1 and 40, De Blok discloses a thermoacoustic generator system comprising: a housing (figures 1-4) containing a working volume of gas with a pressure (p), a thermoacoustic core (1) supported in the housing and having a first heat exchanger (6) and a second heat exchanger (7), the thermoacoustic core operable to introduce acoustical power into the housing thereby oscillating the pressure of the gas at a frequency (column 2, summary of the invention). De Blok also discloses an electromechanical generator (2, 3).

However, De Blok fails to disclose a piezoelectric alternator supported in the housing and having a face that is movable when acted on by acoustical power, the alternator further including a portion of piezoelectric material operable to produce electrical power when acted on by a stress, the portion of piezoelectric material being in mechanical communication with the movable face such that movement of the face stresses the portion of piezoelectric material so as to produce electrical power; wherein the alternator has a moving mass that serves as a substantial portion of the resonating mass inside the housing.

Kolm discloses a piezoelectric alternator (figures 4-6) to be supported in a housing and having a face that is movable when acted on by acoustical power and produces electrical power when acted on by stress (by its nature, the piezoelectric material generates electrical energy when deformed and deforms when acted on by acoustical power).

Therefore, it would have been obvious at the time of the invention was made to replace the Electro-mechanical generator disclosed in De Blok by a piezoelectric alternator as disclosed

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by Kolm for the purpose of converting waste acoustical energy into electrical energy using an efficient and compact device.

It should be noted that the limitation of: "thereby providing a pressure oscillation frequency in the housing substantially lower than that for a similar system with a rigid member replacing the alternator" is a functional limitation -comparing the invention with the prior art- and has been given little patentable weight.

With regards to claim 2, as shown in figures 1-4 (De Blok's) the Electro-mechanical converter blocks the passage of the gas. In the same way, when replacing this E/M converter with the piezoelectric alternator, one of the faces substantially blocks the passage of the gas.

With regards to claims 3-5, the piezoelectric alternator of Kolm have a movable faces (layers 32 and 34). De Blok discloses, the use of a membrane bellows as shown in figures 1-4. E/M generator in De Blok shows a bellows construction working as a diaphragm that oscillates when the gas oscillates. Therefore, it would have been obvious at the time of the invention was made to have a generator/alternator in a compact and efficient structure.

With regards to claim 19, the Examiner takes Official Notice that it is well known in the art of piezoelectric to use a spring in combination with the piezoelectric to change the stiffness and damping characteristics of the system. Therefore, it would have been obvious at the time of the invention was made to use a spring in connection with the piezoelectric to change the stiffness and damping characteristics of the system.

With regards to claim 40, De Blok and Kolm discloses different uses for their inventions, including refrigeration, heating, engine for driving pumps, heat pumps, etc.

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***Allowable Subject Matter***

6. Claims 6-18 and 20-24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The references of the Prior Art of Record fail to teach or suggest either alone or in obvious combination the limitations as set forth in claim 6, and specifically comprising the limitation of the perimeter member, a hub and spokes interconnecting the hub and the perimeter member. For the same reasons claim 14 is found to be allowable.

8. With regards to claim 20, the prior art fails to disclose the perimeter wall having a plurality of wall segments interconnected by springs.

***Conclusion***


9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jaydi A. Aguirrechea whose telephone number is 571-272-2018. The examiner can normally be reached on M-Th 9-7.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren E. Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
JAA  
10/29/05

  
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SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800